



PATENT SPECIFICATION

DRAWINGS ATTACHED

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COMPLETE SPECIFICATION

Gusseted Multiwall Bag

We, WEST VIRGINIA PULP AND PAPER COMPANY, a Corporation organized under the laws of the State of Delaware, United States of America, of 230 Park Avenue, New York 17, State of New York, United States of America, do hereby declare the invention, for which we pray that a Patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The present invention relates to gusseted multiwall bags and is particularly directed to improvements in bags of the type disclosed in co-pending Application No. 31133/63 (Serial No. 1,039,028).

In the bag disclosed in the parent case, a particular stepped end configuration is provided which permits the formation of strong end closures in a multi-wall, gusseted bag by a simple folding and sealing operation. This bag is, therefore, well-suited for use in packaging heavy bulk products by means of automatic packaging apparatus; wherein strength and simplicity of end closure formation is essential. In this bag, in addition to the advantages of strength and simplicity in formation, the ends are so designed that the top and bottom of the bag blanks are identical but reversed in shape; whereby the blanks may be formed from a continuous web of material without waste.

Although bags of this type are thus well-suited for the packaging of most materials, it has been found that in the packaging of particularly fine granular materials, liquids and other products that flow quite readily and/or are easily aerated, some leakage of the product may occur at the juncture of the transverse edge of the bag wall and the longitudinal edge of the adjacent gusset. This results because at this juncture the complete sealing of the interior of the bag is dependent entirely upon the maintenance of a continuous line of adhesion. Thus, in subsequent handling of the bag, for example, a slight separation of the adhered

areas at this corner may occur and cause the formation of a small aperture. Although this is of little concern in the packaging of many products, it may permit leakage of liquid products or those of fine granular form, such as activated carbon.

An object of the present invention is to prevent this problem and permit the packaging of fine granular or liquid products without leakage and without the use of additional or waste packaging material but still provide the same strong, easily formed end seals disclosed in the parent case.

In accordance with the present invention, there is provided a gusseted multi-wall bag formed from a blank of plies of material, such as paper, having a flat front wall and a flat rear wall connected to each other along their longitudinal edges through gusseted walls, the front and rear walls as well as the gusseted walls being about equal in longitudinal length and displaced longitudinally relative to each other such that the front panel of the gusset wall extends below the front wall, the back panel of the gusset wall below the front panel, and the rear wall below the back panel, the displacements being substantially equal to each other in longitudinal length to provide rectangular bag end closure areas which extend to the longitudinal edge of the bag and which are folded over and are attached, as by gluing, to the front or rear wall, the front and rear walls of all of said plies being substantially identical and coincident throughout a major portion of their extent with portions of at least one ply being non-identical, said non-identical portions in said one ply occurring adjacent the intersections of transverse edges of its front walls and back walls with adjacent longitudinal edges of adjacent gussets, said nonidentical portions of said one ply comprising notches in two adjacent corners of the front wall of said ply and tabs positioned adjacent the other corners of said front wall of said ply, and

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notches in two adjacent corners of the rear wall of said one ply and tabs positioned adjacent the other corners of said rear wall of said ply.

5 Although at least one ply of the bag of the present invention is thus shaped somewhat differently from the other ply or plies thereof, and differently therefore from the plies of the bag disclosed in the parent case, the overall
10 configuration of the bag is substantially identical. Therefore, the same simplified folding and sealing operations used to form the ends of the former bag may be used with that of the present invention. A continuous, multi-ply web
15 of bag blanks formed in the manner of the present invention is, therefore, ideally suited for use in continuous, automatic packaging apparatus where simplicity of forming operations are essential.

20 The present invention, therefore, provides a multi-wall bag incorporating positive seals in its end closures.

25 Additionally, the ply or plies providing these seals may be formed from a continuous web of packaging material without waste of the material.

30 Further, the formation of the ply or plies providing the end seals requires no more packaging material than the formation of the plies lacking this feature and hence results in no increase in material costs.

35 It will also be noted that the closing of the bag incorporating this positive seal may be simply accomplished; thereby rendering the bag ideally suited for use in automatic packaging apparatus.

40 An embodiment of the present invention will now be described by way of example with reference to the accompanying drawings, in which:

Figure 1 illustrates the manner in which a web of multi-wall bag blanks are formed;

Figure 2 is a view of a portion of a web of bag blanks;

45 Figure 3 is an exploded view showing a seal-providing ply of the multi-wall bag blank separated from the other plies thereof;

50 Figure 4 is a view of the assembled bag blank folded into tubular form with the ends of the tube open;

Figure 5 is an enlarged view of a portion of the bag showing details of the corner construction thereof; and

55 Figure 6 is another enlarged view of a portion of a bag showing more clearly the manner in which the positive seals are provided at the corners of the bag.

60 Referring to Figure 1 of the drawings, there is therein somewhat schematically illustrated the manner in which a web, in roll form, of multi-wall bag blanks is formed. As therein shown, a plurality of rolls, supplying webs 1, 2, and 3 of packaging material, are placed on unwind stands (not shown) from whence the
65 webs are led through perforators 4, 5 and 6.

Each of the perforators 4, 5 and 6 may conveniently be of the roller type wherein one of the rollers carries a plurality of perforating knives and the other roller a plurality of matching sockets; the knives and sockets being distributed about the periphery of the rollers in a manner such that the desired perforation pattern is impressed on the material passing therebetween. The particular type of perforating equipment used, however, does not form a part of the present invention and any suitable type, therefore, may be used.

70 As each web passes through its associated perforator, a pattern of perforations is formed therein outlining the shape of a bag ply. Thus, in the present embodiment, perforators 5 and 6 may produce a series of perforations outlining plies 7 and 8 (see Figure 3) while perforator 4 may be used to produce the blanks of ply 9. From perforators 4 and 5, respectively, the associated webs 1 and 2 are passed through cross-pasting units 10 and 11 where adhesive is applied to the underside of each of the webs at spaced locations. As it is not necessary to apply adhesive to web 3, it is merely passed around a turning roller 12 and thence, to the combining rolls 13 and 14 where the three webs 1, 2 and 3 are joined to form a laminated web of bag blanks 15. It will be understood that the perforating and combining of the webs 1, 2 and 3 to form the laminated web 15 is suitably regulated to insure that the perforations in each of the webs 1, 2 and 3 are, for the most part aligned, and otherwise correctly positioned relative to one another, to form a laminated web of bag blanks. The laminated web 15 is then led from the combining rollers 13 and 14 to a rewind stand, where it is wound into roll form for convenient storage, shipment and subsequent use.

105 It should be noted that in the formation of the laminated web 15, each of the rolls of packaging material are offset axially of one another to provide the staggered longitudinal edges shown in Figure 2. Thus, as shown in Figure 2 the longitudinal edge 16 of web 3 may be offset from the longitudinal edge 17 of web 2, which in turn is offset from the longitudinal edge 18 of web 1. As the webs are all of constant width, the opposite longitudinal edges, of course, will be offset in a similar but reverse manner.

120 Turning now to Figure 3 of the drawings, there is therein shown a typical bag blank taken from the web of bag blanks shown in Figure 2 but with the ply 9 formed from web 1 separated from the plies 7 and 8 to show more clearly the different configuration of the transverse edges of the ply 9 relative to the plies 7 and 8. Plies 7 and 8, which are identical except that the longitudinal edges thereof are displaced relative to one another, each exhibit a front wall 19, a rear wall consisting of two rear wall segments 20 and 21, gusseted walls consisting of front panels 22 and back panels
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23. Front panels 22 are offset longitudinally from front wall 19 to form steps 24 whereas back panels 23 are offset from front panels 22 to form steps 25. Similarly, rear wall portions 20 and 21 are offset from back panels 23 to form steps 26.

Ply 9, except for an important difference which will presently be explained, is quite similar in construction to plies 7 and 8. Thus, ply 9 exhibits a front wall 19¹, rear wall portions 20¹ and 21¹, gusseted walls consisting of front panels 22¹ and back panels 23¹. In ply 9, however, rather than the intersections of the longitudinal edges 27 of back panels 23¹ and the transverse edges 28 of rear wall portions 20¹ and 21¹ forming a step, as in the case of plies 7 and 8, the transverse edges 29 of back panels 23¹ are extended to form tabs 30. Similarly, at the juncture of the longitudinal edges 31 of the front panels 22¹ with the transverse edge 32 of front wall 19¹, tabs 33 are provided for a purpose which will be presently explained. As the ply 9 is formed from a continuous web without waste between adjacent blanks, the provision of tabs 30 and 33 results in the removal of similarly shaped portions, as at 34 and 35, respectively, from the ends of the blank preceding and following it.

After formation of the web 15 of multi-wall bag blanks, it may be transferred in this form for use in automatic packaging apparatus. In apparatus of this type, the web is continuously shaped into a gusseted, tubular form, filled with the product to be packaged, the filled portion separated from the remainder of the tube along the transverse line of perforations, and the ends folded and sealed to form a filled, sealed bag. Alternatively if the bag is to be filled and sealed by manual or semiautomatic methods, the web is passed through a tuber and then broken off at the lines of perforations to form a series of open-ended bags for subsequent manual or semi-automatic filling and sealing.

In either case, the resulting bag blank is eventually folded about the parallel, longitudinally extending fold lines 36—38 with the stepped longitudinal edges thereof secured to one another, as shown in Figure 4, with panels 22 and 23 folded inwardly between the front wall 19 and rear wall formed of rear wall portions 20 and 21. When thus assembled, the removed portions or notches 34 and 35 of the ply 9, which result from the provision of the tabs 33 and 30 on adjacent blanks, are backed by portions of the plies 7 and 8. Hence, the removal of these portions does not affect the sift-proof qualities of the bag. Additionally, as this portion of the bag blank will be folded over to form an end closure of the bag, the loss of one ply at this point in no way affects the overall strength of the bag. However, by the provision of tabs, as at 30 and 33, a positive seal is provided at the corners of the bag.

This is perhaps more clearly shown in

Figure 5, where the portion of a corner of a folded bag blank containing the tab 33 is shown in more detail. Referring to Figures 4—6, it will be apparent that in use, the contents of a filled bag will ordinarily extend within the bag up to the points indicated by the lines *a—*a** and *b—*b**, where the ends of the bag are folded over to form an end closure. Without the provision of the tabs provided by the present invention, any separation between the outer surface of the bag and the inner surface of the adjacent gusset, as for example, at point 39, would allow leakage of the packaged material from the bag. In the bag provided by the present invention, however, a tab of material, as at 33 in Figures 5 and 6, extends as a continuation of front panel 22 of inner ply 9 around the corner formed by the lower transverse edge of the front wall panel and the longitudinal edge of the front gusset to provide a positive seal at the ends of fold line *b—*b**. Hence, when the ends of a bag, namely those portions above and below, respectively, fold lines *a—*a** and *b—*b**, are folded over and secured to the rear and forward surfaces, respectively, of the bag, prevention of leakage at points 39 is not dependent on adhesion alone since the tabs 30 and 33 effectively block the passage of material in the bag past these corners even though some separation of the adhered areas occurs.

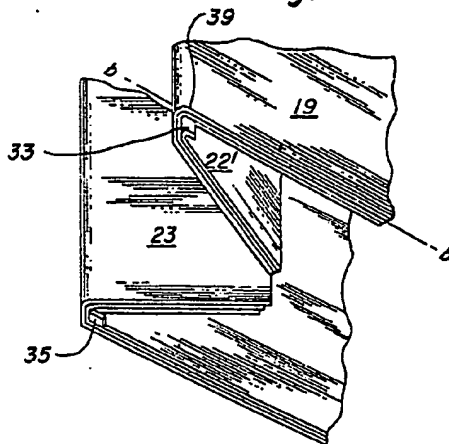
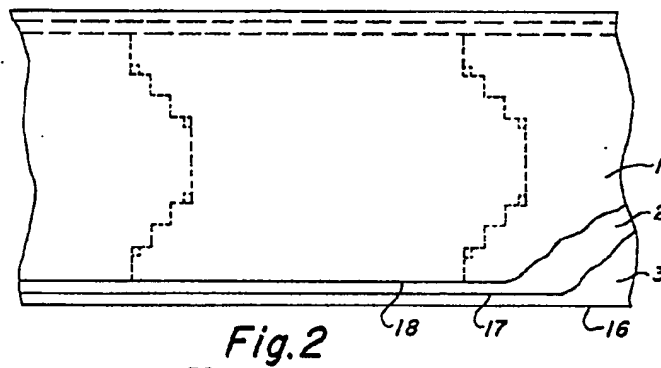
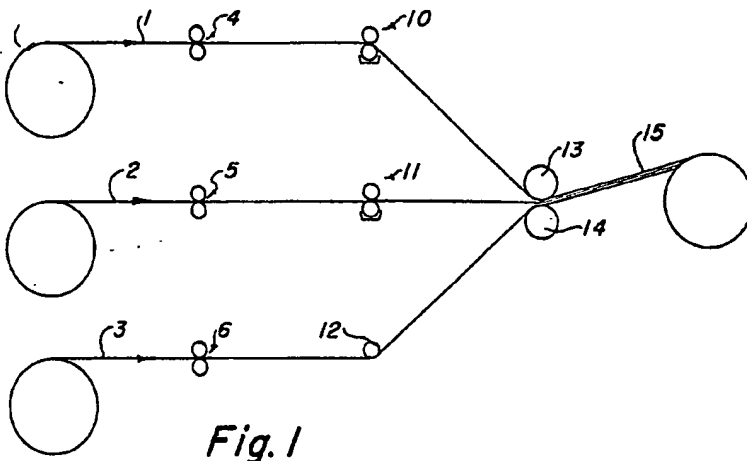
It will thus be apparent that, by the present invention, a bag incorporating a positive seal at those points wherein leakage is most likely to occur has been provided at no increase in packaging material and without affecting the overall strength and sift-proof qualities of the bag. Additionally, the same strong, easily formed end closures disclosed in the parent case are retained in the present construction.

Certain modifications can be made in the embodiment above described. For example, the number of plies may be varied to suit the requirements of the particular use contemplated and plies of the same or different materials may be used as desired.

WHAT WE CLAIM IS:—

1. A gusseted multi-wall bag formed from a blank of plies of material, such as paper, having a flat front wall and a flat rear wall connected to each other along their longitudinal edges through gusseted walls, the front and rear walls as well as the gusseted walls being about equal in longitudinal length and displaced longitudinally relative to each other such that the front panel of the gusset wall extends below the front wall, the back panel of the gusset wall below the front panel, and the rear wall below the back panel, the displacements being substantially equal to each other in longitudinal length to provide rectangular bag end closure areas which extend to the longitudinal edge of the bag and which are folded over and are attached, as by gluing, to the front or rear wall, the front and rear

- walls of all of said plies being substantially identical and coincident throughout a major portion of their extent with portions of at least one ply being non-identical, said non-identical portions in said one ply occurring adjacent the intersections of transverse edges of its front walls and rear walls with adjacent longitudinal edges of adjacent gussets, said non-identical portions of said one ply comprising notches in two adjacent corners of the front wall of said ply and tabs positioned adjacent the other corners of said front wall of said ply, and notches in two adjacent corners of the rear wall of said one ply and tabs positioned adjacent the other corners of said rear wall of said ply.
2. A gusseted multi-wall bag according to claim 1, wherein said tabs have at least two sides thereof meeting at right angles, one of said sides of said tab being common to a portion of a transverse edge of a wall, and the other of said sides of said tab being common to a portion of a longitudinal edge of a gusset.
3. A gusseted multi-wall bag according to claim 1 or 2, wherein said notches have at least two sides thereof meeting at right angles, one of said sides extending inwardly towards the centre of a wall as a continuation of the transverse edge of an adjacent gusset, and the other of said sides extending from said one side to the adjacent transverse edge of the wall in which it is formed.
4. A gusseted multi-wall bag according to any one of claims 1 to 3, wherein the ply having non-identical portions is the inner ply of the bag.
5. A gusseted multi-wall bag according to any one of the preceding claims, wherein the sides of said notches and said tabs are substantially identical in length.
6. A gusseted multi-wall bag formed from a blank of plies of material, such as paper, substantially as hereinbefore described with reference to the accompanying drawings.
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& ROLLINSON,
Chartered Patent Agents,
Agents for the Applicants.



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COMPLETE SPECIFICATION

2 SHEETS

This drawing is a reproduction of
the Original on a reduced scale
Sheets 1 & 2

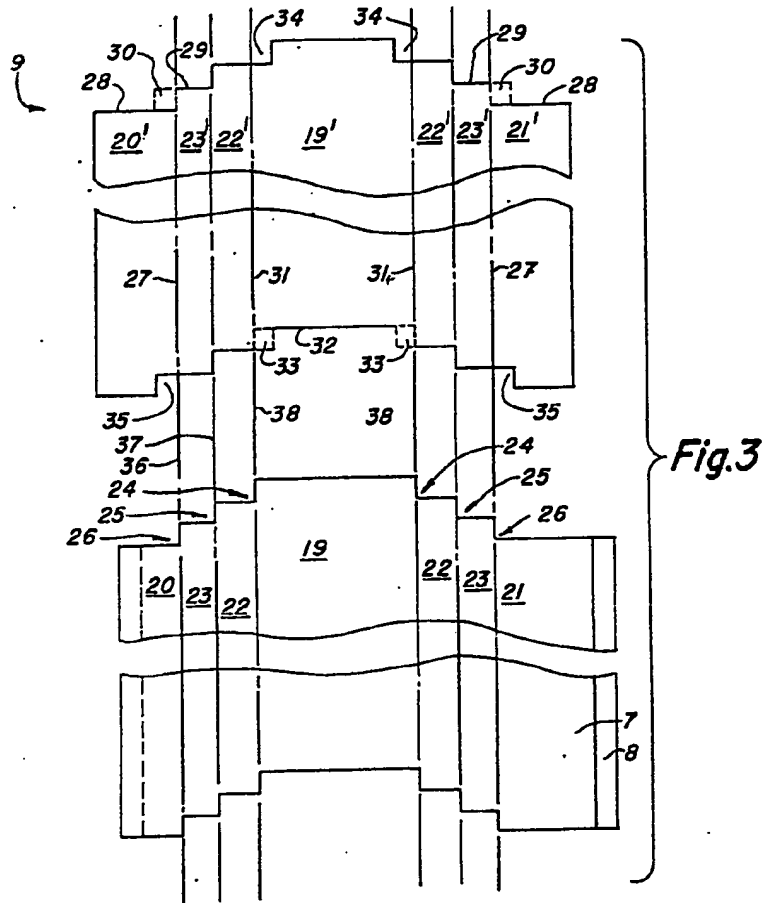
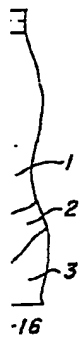


Fig. 3

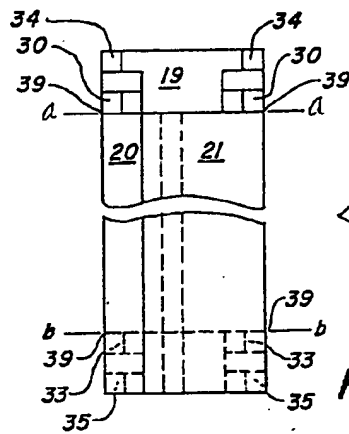


Fig. 4

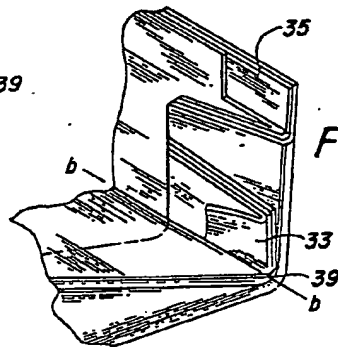


Fig. 6